

What is claimed is :

- 1) A method for manufacturing an aluminum alloy plate having a reduced level of residual stress, said method comprising
 - a) providing a solution heat-treated and quenched aluminum alloy plate having an initial thickness at a predetermined location of at least about 5 inches and having a longest edge and optionally a second longest edge,
 - b) stress relieving said plate by compressing the plate at a total rate from about 0.5 % to about 5 % permanent set along said longest or said second longest edge thereof ,

wherein the length of the compressed edge of the plate is no less than twice and no more than eight times said initial thickness.

- 2) A method according to claim 1, wherein said plate comprises an alloy of the series 2xxx, 6xxx or 7xxx.
- 3) A method according to claim 1, wherein said plate has a thickness of less than 40 inches.
- 4) A method according to claim 1, wherein said plate has a thickness between 10 and 30 inches.
- 5) A method according to claim 1, wherein prior to solution heat-treating and quenching said plate has been subjected to rolling and / or forging.
- 6) A method according to claim 1, wherein said compressing is performed in up to three steps with at least partial overlap of compressed areas.
- 7) A method according to claim 1, wherein said compressing is performed at a temperature of less than 80 °C.
- 8) A method according to claim 1, wherein said compressing is performed at a temperature of less than 40 °C.

- 9) An aluminum alloy wrought plate product having a thickness between about 5 and about 40 inches, wherein said plate has been subjected to a solution heat treatment, and quenching and stress relief by compression at a total rate of 0.5 % to 5 % permanent set, wherein the stored elastic energy W_{Tbar} along the T direction is less than 0.5 kJ/m^3 .
- 10) An aluminum alloy wrought product according to claim 9, wherein said product has a length L and a width W such that $L \times W > 1 \text{ m}^2$.
- 11) An aluminum alloy wrought product according to claim 9, wherein said product has a length L and a width W such that $L \times W > 2 \text{ m}^2$.
- 12) An aluminum alloy wrought plate of claim 9, wherein the W_{Tbar} is less than 0.3 kJ/m^3 .
- 13) A method for stress relieving an aluminum alloy plate comprising compressing said plate in a predetermined direction, wherein the efficiency of said stress relief in terms of total stored energy W_{tot} is 50% or less after said compressing as compared to a standard short transverse stress-relief.
- 14) A method of claim 1, wherein said initial thickness is substantially uniform throughout said plate.
- 15) An injection mold comprising a plate according to claim 9.
- 16) An injection mold comprising a plate manufactured according to a method of claim 1.
- 17) A blow mold comprising a plate according to claim 9.
- 18) A blow mold comprising a plate manufactured according to a method of claim 1.
- 19) A machined mechanical workpiece comprising a plate manufactured according to a method of claim 13.
- 20) A spar suitable for use with an aircraft comprising a plate according to claim 9.